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Front and back covers: Detail of skirt, attributed to Vizarrón de Montes, Querétaro, Mexico. The Textile Museum 1976.24.11, given in memory of Rene d'Harnoncourt by his family. See Davis, p. 56, fig. 9.

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Mexican Stitch Resist Dyed and Tie Resist Dyed Textiles: A Tradition Vanishes

Virginia Davis

Dedicated to artisans Señora Romalda Olguín, Doña Sixta Trejo Zamorrano, Señora Dolores Aguilar, and to their researchers Elsie McDougall, Irmgard W. Johnson, Bodil Christensen, Guy Stresser-Pean, Ruth Lechuga, and Marta Turok, without whose efforts artisans' work would have been lost

In Mexico in former times, the Otomí in the states of Hidalgo and Querétaro knew about and practiced several resist-dyeing techniques for the decoration of textiles. One technique consists of binding a resist pattern on groups of warp or weft varns and then dveing them before weaving. This bound-yarn resist dyeing is often called ikat, after the Indonesian term, and called jaspe, or amarrado in Mexico. Other techniques, comprising stitch-resist (cosido) and tie-resist (atado) methods, are effected on woven cloth. These processes are sometimes referred to in the literature by the Indonesian terms for stitch and tie, tritik and plangi, respectively. Traditionally a part of the weaving and dveing repertory in Hidalgo and Querétaro, these techniques were last observed in the 1970s, although bound-warp yarn resist may still be done in Tolimán, Querétaro. An attempt to preserve the endangered tradition of this type of cloth decoration and its distinctive techniques was unsuccessful. Today, in addition to establishing provenance and cataloguing examples, it is important to preserve the record of the existence of these techniques and the manner of their practice in the local context. Chiefly, I will discuss in detail research conducted by three women and their colleagues over a span of fifty-three years concerning stitch resist and tie resist on skirts and other items made by Otomí and mestizas in Hidalgo and Querétaro. The history of the collecting and documentation of these examples in the field is important in and of itself: by Elsie McDougall in 1936-37 in

Ixmiquilpan and Zimapán, Hidalgo; by Irmgard Weitlaner Johnson, Bodil Christensen, and Guy Stresser-Pean in 1949–53 in Vizarrón, Querétaro; and by Ruth Lechuga and Marta Turok, who attempted to rescue the tradition in 1977–79 in Vizarrón and San Juan del Río, Querétaro. The research of these ethnographers included identification of indigenous artisans and documentation of processes. Given the progress of global homogenization, the future may find such records of past traditions valuable not only as history, but also as a tool for possible recovery of techniques that otherwise would be irrevocably lost.

Resist-dyeing processes in general figure as one of Elsie McDougall's principal interests in the materials from her collection at the American Museum of Natural History in New York. McDougall was particularly interested in the existence of both pre-and post-weaving resist techniques in Hidalgo since this is a rare occurrence in Mesoamerican textiles. "Compressionresist dyeing" is a general term used to describe the methods of resist dyeing prevalent in Mesoamerica. In bound-yarn resist, groups of threads are bound and compressed and then dyed prior to weaving, the pattern of compression being reserved in the original thread color. Using examples from the McDougall collection, I have previously written on the bound-warp yarn resist rebozo, a long narrow shawl and carrying cloth with fringed ends (Davis 1996).

McDougall's collection also includes rare textiles (skirts and commissioned samples) patterned by two cloth resist-dyeing processes, stitched and tied, which are also types of compression-resist dyeing. In the stitch and tie resists on fabric, the pattern is placed on finished woven cloth by sewing and/or tying sections of cloth; then the cloth is compressed and dyed. The stitch and/or tied compressed pattern areas are called "reserved." The physical compression of the cloth prevents the dye from entering those pattern areas. The pattern areas are not dyed, while the background becomes the color of the dye. The knowledge of the existence of these rare skirts and commissioned samples of

Fig. 1. Maps showing location of Mexican states having Otomí population: Hidalgo, Querétaro, and state of México. The shaded area in the top map shows the approximate extent of the Toltec empire, A.D. 950–1150 (adapted from Anawalt 1990, p. 293, with permission of the author).





Mexican stitch-resist and tie-resist patterning in the McDougall Collection provided the impetus for the investigation of the history, prevalence, and disappearance of this technique in Mexico.

Pre-Conquest and Historical Antecedents

Examination of archaeological and historical materials provides plausible evidence for the use of resist dyeing, particularly in the states of Hidalgo, Querétaro, and Puebla, in pre-Hispanic times with continuity through the Conquest. The tie-resist motif appears on the cloak of the Toltec emperor, Nezahualpilli (Anawalt 1993). Within the ancient boundaries of the Toltec empire in its northeast, there is a geographic coincidence with parts of the modern Mexican states of Hidalgo, Querétaro, Puebla, and the state of México (fig. 1). It is possible to suggest a cultural survival from pre-Conquest times of resist-dyeing techniques in this area.

Preservation of archaeological textiles is rare in Mesoamerica due to unfavorable climatic conditions. There is nevertheless an archaeological fragment of weaving decorated in the tie-resist technique (Mastache de Escobar 1972-73). This brown cotton fragment comes from the Don Bonfilio Cave near Caltepec in the region of Tehuacán, Puebla. A precise chronology cannot be established because of looting of the site. The fragment is composed of eight narrow bands, each with two finished side selvedges. The bands are joined longitudinally to produce the larger cloth. The tie-resist designs consist of small (diameter 1.5-1.8 cm and .5-.8 cm) undyed circles with irregular outlines, having a dyed spot in the middle (Mastache de Escobar 1972-73, pp. 255-56). Because the cloth is so fragmented, it is impossible to determine the original overall layout of the tied design, or whether the tie motif was introduced before or after the bands were sewn together. Chemical analysis, however, shows that the dye was indigo (Mastache de Escobar 1972–73, Table II, pp. 260–61). Although very fragmentary and lacking an exact date, these small pieces of cloth provide concrete evidence for the pre-Conquest existence of the tie-resist technique.

Another tantalizing piece of evidence was presented by Pedro González from Guanajuato in 1895 at the Eleventh International Congress of Americanists held in Mexico City (González 1897). Señor González described objects from the most outstanding group of pyramids located at

Apaseo in the southeastern part of the state, which are very likely proto-Otomí. One pyramid has a structure at its summit that González compares to the Castillo at Chichén Itzá. A human skeleton was found in a subterranean passage of this pyramid; the individual was wearing a tilma of pita (a leaf fiber) (González 1897). A tilma (tilmatli), sometimes called ayate (ayatl), a principal pre-Conquest garment for men, is a cape constructed of one or two rectangles. It is worn knotted in front or over one shoulder (Cordry and Cordry 1968, pp. 8, 166, 167). The tilma from Apaseo is pictured draped over a chair (fig. 2). Although no dimensions are given, the cape appears to be full length. There are large holes. The large circular and V-shaped motifs in white appear to have been made by a series of stitches, very rare in pre-Conquest textiles. Tie resist generally produces diamond shapes of varying sizes. This picture of the tilma suggests that the cape was almost certainly decorated by both stitch-resist and tie-resist methods. Further investigation of this artifact would be valuable.

Painted representations of textiles also provide evidence that the method of decorating cloth by tie resist existed in pre-Conquest Mesoamerica. Examples are not scarce, and only



Fig. 2. *Tilma* (man's cape) found in the pyramid of Apaseo (González 1897, p. 156).

a few will be presented here. There is an additional caveat: a pictorial representation always allows the possibility that what is being depicted was produced by stamps (*sellos*) or all-over woven diamond patterns.

A wealth of costume information occurs on Maya vases, although no major study on this subject has yet been produced. One cylindrical vase, dated ca. 672-830 C.E., shows three figures, dressed in the clothing of the Maya elite, wearing "kilts" with a decoration that could be tie-resist diamonds (Reents-Budet 1994, pp. 38, 315; Coe and Kerr 1998, pp. 84-85).2 The so-called Princeton vase from the same period depicts a young woman attending God L; she wears a robe with very large tie-resist motifs (Reents-Budet 1994, pp. 39, 280-81, 356). An old man clad in tie-dye is shown dancing with a boa constrictor on the superb Late Classic, eighth-century, Alter de Sacrificios Vase (Coe and Kerr 1998, p. 90). Here, it is tempting to speculate that the use of the diamond-layout tie-resist design reinforces the identification of man and snake.

In one of the great Classic Maya mural paintings at Bonampak, on the south wall of Room 1, a chieftain is depicted wearing a loincloth with a blue tie-resist pattern (Bernal 1958, plate XXIII). In a Classic Period mural at the Zapotec site of Monte Albán, Oaxaca, on the north wall of Tomb 105, a goddess wears a blue cloak with a tie-resist motif (Bernal 1958, plate IX). In the part of the state of Tlaxcala that was an area of interchange between Oaxaca and Puebla, at the archaeological site of Ocotelulco, a painted altar, tentatively dated between 1400 and 1450 C.E., shows gods of the Nahuatl region (one perhaps is Quetzalcóatl) whose cloaks display a diamond-motif tie resist (Contreras 1991, p. 54).3 Archaeologist José Eduardo Contreras, chief of the group that worked at this site, states that the imagery, form, and color are identical to comparable elements in the Codex Borgia, whose creators were from the same area.

Codices from the Mesoamerican cultures are manuscript documents from both before and after the Conquest that contain pictures and hieroglyphs with historical, political, and religious content. From among the many examples of the representation of resist-dyed costume in these documents, I will mention only a few significant instances where such a costume has a particular role.

Thought to be from the region of Cholula, the *Codex Borgia* (*Codex Borgianus* 1976, summary p. 43), which was written and painted prior to

the Spanish conquest, is a Nahua work with a ritual calendar, gods, and rites. Pages (laminas) 55, 58, and 59 depict ritual priests impersonating the goddess Xochiquetzal. Her name means "precious flower," and she is a water related fertility deity who represents women as creators of life and cloth; her wrap-around skirt has resist patterning like that on the Ocotelulco altar. There is more specific information in the post-Conquest Codex Telleriano-Remensis (Quiñones Keber 1995, p. 139). Dating from ca. 1562-63 C.E. and painted in the Valley of Mexico, possibly by Pedro de los Ríos, it is a Book of Days (Tonalamatl): a twentyday ritual and divinatory calendar that must be consulted in terms of behavior for action on a particular day. Xochiquetzal is feted on the day 7 Xochitl by women who know how to spin, weave, and embroider (Quiñones Keber 1995, p. 187). Since the animal associated with Xochiquetzal is the snake (Quiñones Keber 1995, p. 187), it is not too far-fetched to associate the tie-resist, grid-like diamond pattern of her wrap-around skirt with the patterning of snakeskin. It would seem that this skill of the creation of pattern by the tie-resist technique belonged in the repertory of women who spun thread, wove cloth, and embroidered.

There is imagery from post-Conquest codices that provides clues about a geographic location where the tie-resist technique existed. Juan Bautista Pomar, in the Relación de Texcoco of 1582 says, "When the prince succeeded as king to the kingdom, the first thing they did was to cover him with a royal robe of blue cotton of the kind painted in this relation" (Thompson 1940, p. 17). The late sixteenth-century work by the mestizo historian, Don Fernando de Alva Ixtlilxóchitl, Codex Ixtlilxóchitl, has a portrait of Nezahualpilli, king of Texcoco, one of three Aztec rulers (Boban 1891, plate 69), garbed in a blue cloak and loincloth with an important tie-resist motif. Patricia Rieff Anawalt (1993) brilliantly analyzed this design motif; she concludes that it is characteristic of a Toltec ruler, and probably represents a claim to legitimacy for the Mexica (Aztec) rulers based on having Toltec roots (Anawalt 1993, pp. 30, 34). She quotes Sahagún's account from his Mexica informants: "The Toltecs' clothing was-indeed their privilege was—the blue knotted cape (xiuhtlalpilli)" (Anawalt 1993, p. 35). The word for the rulers' cape, xiuhtlalpilli, in Nahuatl means xiu (itl), turquoise, and tlalpilli means tied or knotted (Anawalt 1993, pp. 35-36). It was "an heraldic device that declared the Aztecs' claim to genealogical heritage" from the Toltecs (Berdan



and Anawalt, 1992, vol. 1, p. 138). Both Aztec noblemen and noblewomen wore garments with blue tie resist. The Lienzo de Tlaxcala and the Codex Azcatitlan show noblewomen wearing tie-resist skirts, perhaps bestowed by the ruler (Berdan and Anawalt, 1992, vol. 1, pp. 139, 106). As part of the tribute from eleven of the thirtyeight provinces they controlled, the Aztecs required mantles apparently having blue tieresist designs. The quantity going to Tenochtitlan was 9,600 annually, according to the Codex Mendoza, written in the early 1540s (Anawalt 1993, pp. 33, 36). The eleven provinces that sent tie-resist tribute cloth were all on a contiguous north-south band on either side of Tenochtitlan, and all were within the ancient Toltec boundaries (Berdan and Anawalt, 1992, vol. 1, pp. 138-39).

Interestingly enough, the northeastern part of the ancient Toltec empire coincides with the modern states of Querétaro, Hidalgo, and the state of México, the Otomí heartland, where compression-resist techniques survived into the twentieth century. The archaeological specimen from Puebla also indicates the possibility of the use of these techniques in Puebla from the pre-Conquest period on. In eighteenth-century castas painting and nineteenth century lithographs and painting, there are also representations of women wearing skirts whose decoration strongly suggests stitch resist and tie resist (Davis ms., p. 3).

Nineteenth- and Early Twentieth-Century Skirts

A skirt in the Coronel Collection in the Los Angeles County Museum of Art has a history that gives a firm nineteenth-century date to a style of stitch-resist/tie-resist skirt similar not only to those in eighteenth- and nineteenth-century representations but also to those collected and researched in Querétaro and Hidalgo in the twentieth century (figs. 3–4, Table I, 1). The form of the skirt, gathered into a waistband, is European, as is the material, wool. The decorative

Fig. 3. Textile (originally a skirt) with design of flowers and vines, ca. 1870s. 91.4 x 270.5 cm. Los Angeles County Museum of Art, Coronel Collection, A.110.59–1101, Los Angeles Chamber of Commerce. Photograph © 2002 Museum Associates/ LACMA.

Fig. 4. Detail of figure 3, showing panel joining.

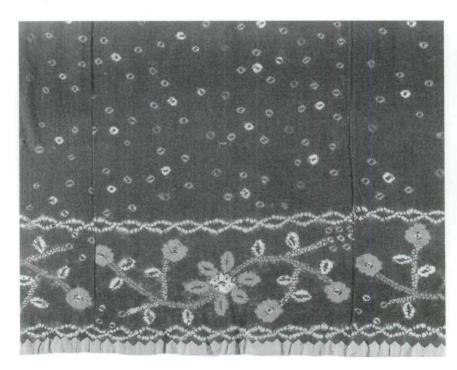




Fig. 5. Albarelo, 18th century, Puebla, Mexico. Height 23.5 cm, diameter at mouth 9.5 cm. White enamel painted in light and dark blue, rim unglazed. Cat. no. (E983) n.n 1502a. Courtesy of The Hispanic Society of America, New York.



Fig. 6. Skirt acquired by Elsie McDougall from Sanborn's in 1933. The Elsie McDougall Textile Collection 65/5158. Neg./Trans. no. 19076, photograph by Elsie McDougall, courtesy Department of Library Services, American Museum of Natural History, New York.



Fig. 7. Detail of figure 6, neg./trans. no. 19077, photograph by Virginia Davis, courtesy Department of Library Services, American Museum of Natural History, New York.



Fig. 8. Skirt, Zimapán region, Hidalgo, Mexico. Brooklyn Museum of Art, Frank L. Babbott Fund 43.195.17.

motifs could plausibly be a mix of pre-Conquest and Spanish styles.

The Coronel Collection has objects and documentation from the estate of Don Antonio Franco Coronel, who arrived in the then Mexican territory of California in 1834 but permanently settled in the Los Angeles area in the 1840s. The seven or eight leading Mexican families who became Californios formed the local elite class. They owned ranchos in the Los Angeles basin, intermingled and intermarried, participated in fiestas and rodeos. Don Antonio was very prominent, dubbed "the mayor of Los Angeles." As a wedding present on the occasion of her marriage in 1873 to Don Antonio, Doña Mariana Franco from San Antonio, Texas, was presented by the del Valle family with "bordered wool material first used as a woman's full skirt, (which was) later made into a cover for a table at the Camulos Rancho, the home of the Ignacio del Valle family for more than fifty years. It was brought from México by the Urquidas family." The Urquidas family arrived in the 1840s.7

This textile does appear to be a former skirt of six panels later made into a tablecloth by removal of the waistband and one vertical seam. At the time of the conversion, the hem, with a pointed design, and two side seams were bound in a plain weave red cotton, approximately the same hue as the red in the wool. The textile has the same color palette combinations, white and red motifs on an indigo background, as six additional surviving skirts, and the same types of decorative pattern layout with stitch resist and tie resist as sixteen of the skirts in the research to be presented.

The patterning on the skirts has two aspects. First there is a field pattern of allover geometric motifs in the upper two-thirds of the cloth. Second, there is a border of leafy and floral vine motifs, around the bottom third (see below, Techniques in Querétaro).8 While the field pattern appears similar to ancient indigenous motifs, the border seems definitely European in style, as does the form of the skirt gathered into a waistband. The use of the undulating vine motif was not limited to textiles: some of the Talavera ceramics introduced by the Spanish in Puebla, where the industry began in the seventeenth century, have similar designs (fig. 5) (McQuade 1999, pp. 34, 42, 45).9 Although we don't know when or where in Mexico the Urquidas family acquired the skirt, the firm dating from the 1870s at the latest is valuable in adding validity to claims that similar skirts date from the nineteenth century.

Two other nineteenth-century skirts with stitch-resist and tie-resist patterning are in the Museo de Indumentaria Mexicana Ramay, Claustro Sor Juana, Mexico City. They were acquired by the museum in 1985 from the Doña Margarita Portillo collection. She in turn had acquired these pieces from Luis Márquez, who bequeathed his collection to her. Márquez purchased them in the 1940s or 1950s. One is said on the accession card to be from Puebla, 1847 (Table I, 2), and the other from Mexico City, 1847 or 1860 (Table I, 3). Unfortunately it is not possible to tell on what these dates were based. The skirt from Puebla (no. 2) is four panels, wool, and remarkably similar to the one in the Coronel collection in pattern layout, stitch-resist and tieresist techniques, and color palette of white, red, and blue. It is gathered and sewn into yellow cloth, and then into the waistband. The other skirt (no. 3) is the same except that only one dye, red, was used, resulting in a white design on a red background. It has green cloth and a waistband at the top. Both skirts have sequins (lentejuelas) sewn on the entire stitch-resist pattern and additional plain cloth borders sewn onto the bottom, probably modifications made by Luis Márquez in the 1950s in order to use them as "china poblana" costume.10 These elegant garments were used by the Ballet Folklórico for a mestizo dance, "Las Margaritas" which is like the Mexican hat dance (jarabe tapatio).

An additional seven textiles are likely to date from the later part of the nineteenth century to 1933. Four of these are discussed in the section on Querétaro (figs. 9, 31, 32; Table III, 1, 11, 12, 13). The other three are probably from Hidalgo (figs. 6-8, 10-11; Table I, 4, 5, Table II, 1). A sixpanel skirt purchased by McDougall in 1933 at Sanborn's (an elegant department store) in Mexico City was said to be "old" at that time and to be possibly from Zacatecas (figs. 6–7; Table I, 4). The photograph used here (fig. 6) was taken by McDougall and shows the skirt in the condition in which she acquired it. She later separated the panels, giving one to the American Museum of Natural History in New York (fig. 7), one to the Peabody Museum at Harvard, one to the Folkens Museum Etnografiska in Stockholm, one to Charles Iklé of New York, and two to the Smithsonian Institution.11 McDougall does not seem to have credited the idea of a Zacatecas origin for the piece and based on the other evidence available it does seem unlikely. This skirt is very similar to the one acquired by the Brooklyn Museum in 1943 from Fred Davis, who was a



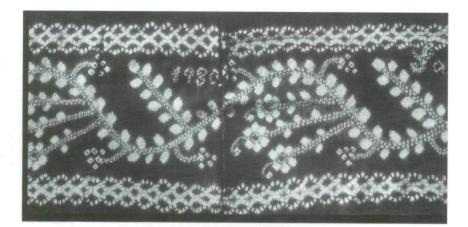


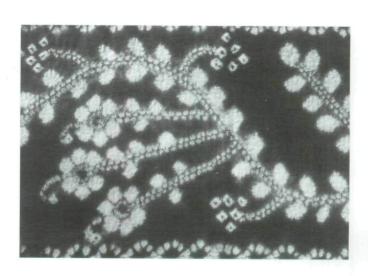
Fig. 10. Detail of two panels of a skirt with the date 1930 stitched in the design, collected in Ixmiquilpan, Hidalgo by Elsie McDougall, 1936. The Elsie McDougall Textile Collection 65/5157, neg./trans. no. 19074, photograph by Virginia Davis, courtesy Department of Library Services, American Museum of Natural History, New York.

Fig. 11. Enlarged detail of figure 10, neg./trans. no. 19075, photograph by Virginia Davis, courtesy Department of Library Services, American Museum of Natural History, New York.



knowledgeable dealer (fig. 8, Table I, 5). The museum was under the impression that it was nineteenth century, although the dating seems to have been speculative on the curator's part. Its age is, however, suggested by the fact that it is six panels, and has a trim of triangular points at the upper edge of the resist-patterned portion. McDougall put its origin as Zimapán, Hidalgo based on information from Irmgard Johnson in 1951 that Fred Davis had four or five skirts from the Otomí region of Ixmiquilpan-Zimapán (McDougall ms.b). Johnson says that Davis collected over a period of thirty years.

The Textile Museum has a four-panel skirt acquired by René d'Harnoncourt in the 1950s (fig. 9, Table III, 11). The overall layout of this piece is like one of the china poblana skirts (Table I, 3). Irmgard Johnson attributes it to Vizarrón, Querétaro, based on her work in that community described below. Another similar skirt from Vizarrón is in the collection of the Museo de Arte e Industrias Populares in Mexico City (Table III, 1). Features suggesting this latter skirt may be old include the fact that it is heavier and has the most panels (eight) of all those documented, and is a finer weave. It is also finished with orange rickrack and yellow soutache that looks homemade. In Ixmiquilpan in 1935 McDougall acquired a piece made of two panels, perhaps a portion of a skirt, with the date "1930" in stitch resist (figs. 10-11, Table II, 1). It has no field pattern, only a border, which is similar to the borders on these Vizarrón skirts.



Altogether, thirty-two examples of Mexican stitch resist and tie resist were studied. The states of Hidalgo and Querétaro are known to be the places of origin of twenty-seven of them, eleven from Hidalgo (Table II) and sixteen from Querétaro (Tables III and IV). In these two areas, precise information about the practice of this type of work was documented. It is probably significant that the Toltec tribute area included parts of the present-day states of Hidalgo, Querétaro, State of México, Tlaxcala, and Puebla (fig. 1).

Elsie McDougall: Field Research in Hidalgo, 1936–37

Elsie McDougall collected textiles decorated with stitch-resist and tie-resist techniques in Hidalgo (fig. 12). English by birth, she was a self-taught ethnographer. In the 1930s, she went frequently to remote parts of Mexico and Guatemala to study and collect many types of textiles. Particularly interested in the resist process of bound-yarn resist, she was delighted to find stitch resist and tie resist occurring in the same locale with bound-yarn resist. Some artisans actually worked in both techniques. In 1936-37, she researched these processes in then remote parts of Hidalgo, principally in the little Otomí village of Ranchito Guadalupe, between Ixmiquilpan and Zimapán (Table II). In order to illustrate the techniques of stitch-resist and tie-resist dyeing as practiced in that area, McDougall commissioned seven samples from an elderly expert weaver and dyer, Señora Romalda Olguín (fig. 13), who spoke Otomí exclusively. Señora Olguín was among those who also practiced bound-varn resist weaving. The main type of textile that McDougall recorded and collected in this community is an apron (delantal). The patterns on these aprons differ from the skirts in being organized in vertical bands, with a narrow horizontal border at the bottom.

Techniques in Hidalgo

There are specific technical characteristics of the material and methods used in the Hidalgo examples collected by McDougall. The textiles, all wool, were handwoven, on a backstrap loom. McDougall photographed Señora Olguín weaving cloth on a backstrap loom set up in front of her dwelling (McDougall ms.b). The yarn in the warp and weft is a well-spun single ply, Z-twist wool yarn. All the textiles presented here are plain weave, rather coarse, ranging from 9–13



Fig. 12. Elsie McDougall, 1883–1961. Anthropology Archive, Case 17. Courtesy American Museum of Natural History, New York.

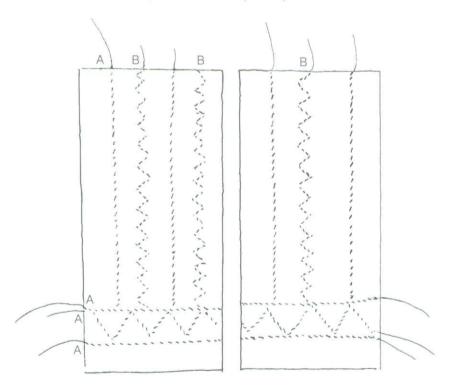


Fig. 13. Señora Romalda Olguín wearing a stitch-resist apron she made. Photograph by Elsie McDougall, 1935–36 (McDougall ms.b), neg./trans. no. 19068. Courtesy Department of Library Services, American Museum of Natural History, New York.

ends per centimeter and 6-10 picks per centimeter. The compression-resist technique used is predominantly stitched. The tool used for stitching was a steel needle, although it was said that in the past a maguey thorn with fiber attached had served. If so, the thorn must have been finer than those McDougall saw in use, which were too thick for this purpose. McDougall found the maguey thorn used as an awl and also as pusher to help push the constricting pleats along the line of the stitching, making possible the physical compression that restricts the dye flow into the compressed area. Ixtle, a maguey leaf fiber, S-spun and Z-plied into cord of different thicknesses, was the binding material used for all the examples. Soaking after binding is often done to



Diagram of position and type of stitch of the drawstrings for the pattern of the two-piece apron cloth.



A Drawstring introduced whip stitch, through and over the top of narrow folds of the cloth.



Fig. 15. McDougall apron commission, rectangular, stitch resist only, white design on red ground. Señora Olguín, 1936–37. The Elsie McDougall Textile Collection 65/5155, neg./trans. no. 19071, photograph by Virginia Davis, courtesy Department of Library Services, American Museum of Natural History, New York.

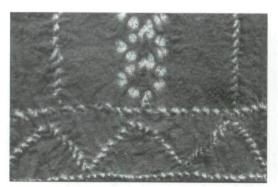


Fig. 16. Detail of figure 15, stitch-resist sample. Neg./trans. no. 19072, photograph by Virginia Davis, courtesy Department of Library Services, American Museum of Natural History, New York.

B Drawstrings, larger in diameter than A, introduced running stitch through relatively deep (almost an inch) folds.

cause the binding element to swell and tighten.

An important aspect of this dye process is that after the application of the dye and the unbinding, the path and type of the binding can be detected because the color of the dye will not have penetrated that path, and, in addition, the cloth will retain the holes made by the needle if stitched and/or marks made by compression. The motifs appear in the color of the cloth before binding and dyeing. In the Hidalgo textiles, there are two main types of manipulation, stitched and tied.

- 1. *Stitched*: the design is sewn with *ixtle* thread and then compressed. There are three subcategories:
- a. Stitched straight: a running stitch in a straight, undulating, or circular line, or in some other shape such as a leaf, which is then pushed along the stitching to compress the cloth.

b. Stitched over a fold: a whip stitch over a fold or a plain running stitch through a fold, in a straight, undulating, or circlular line, which is then pushed along the stitching to pleat.

- c. Stitched, with a knot: if a single flat stitch is used, sometimes through a fold, the ixtle is then tightly knotted. The size and shape of the resist mark depends on the diameter of the binding thread. The stitch can be repeated for overall patterning.
- 2. *Tied*: a point of cloth is picked up; the size may vary. It is bound and tied with the resultant shape being diamond, square or circular, depending on how the cloth is folded. The binding can be overlapping, with the tip of the cloth exposed or not. All of these variations have been observed. Which is used in each specific instance can be discerned by the pattern of dye penetration.

McDougall commissioned an apron (figs. 15–16, Table II, 6) from Romalda Olguín similar to the one she is wearing (fig. 13). The design and straight whip stitch on flat fabric and over folds are diagrammed and explained in her notes (fig. 14).

When using one dye color, the pattern motifs appear, after dyeing and unbinding, in the original cloth color on a background of the dye color. In a sequence of two dyeings, the lighter dye color is usually first in the sequence. The elements of the pattern that are to remain the original color of the cloth are not untied until all the dyeing is finished. In between, there is untying and retying according to the dictates

of the pattern. One can usually discern this sequence in the finished cloth.

Dyes, types, procedures, and recipes in Hidalgo

In the textiles to be discussed, the original cloth is natural, undyed white wool. The single dye most frequently used is blue, traditionally vegetal indigo (añil), but by 1936 a synthetic¹³ blue dye was typical. Less frequently, red is the single background color; it was traditionally cochineal, but this has also been replaced by a synthetic dye. If the two dyes are red and blue, red is the first dye bath, since blue covers the red. The pattern that is to remain white during the dyeing is resisted. After the red dye, some portions of the pattern are resisted to remain red, and some of the white is unbound to become blue.

Indigo dye is particularly appropriate with resist techniques because it requires oxygen for the color to develop. Therefore, when the cloth is tightly bound, it is relatively easy to block the dye from entering the bound areas, thus preventing the color from developing on exposure to air. A light application of blue would give a purplish result over red (fig. 17). But indigo can also give a very dark blue as an overdye that would block combination with another color (e.g., red) if so desired as the last application in a dye sequence, resulting in white and red motifs on a blue background instead of purple (fig. 22; Table III, 2).

Although McDougall states that by 1936–37, synthetic dyes had by and large replaced the traditional indigo and cochineal, she passes on information given her in 1935-36 about them as follows: "An ounce of vegetal indigo, purchased at the druggist of the market town, was used with a pound of Texcoco lakebed salt, tequesquite, from the market and 2 dozen native limones [limes]. For cochineal, a packet of three ounces of the insect bodies, purchased from the druggist, was crushed in a metate. The cochineal, three dozen small limones, and some tequesquite (increasingly a small amount of stannous chloride purchased from the druggist is being substituted) are put into six quarts of boiling water in an earthenware jar (olla)" (McDougall ms.b). McDougall reports the women as saying that the skins of the limes are sometimes added to the wash water for the yarn or cloth, but that washing and bashing (not further explained) are essential before entering it into the boiling dye bath.



Fig. 17. Detail of stitch-resist sample and tie-resist sample, possibly apron, in red and blue, giving purple. Commissioned from Señora Olguín by Elsie McDougall, 1936. The Elsie McDougall Textile Collection 65/5156, neg./trans. no. 19073, photograph by Virginia Davis, courtesy Department of Library Services, American Museum of Natural History, New York.

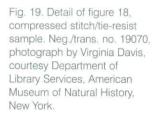






Fig. 18. Compressed stitch-and tie-resist sample, commissioned from Señora Olguín by Elsie McDougall, 1936. The Elsie McDougall Textile Collection 65/5154, neg./trans. no. 19069, photograph by Virginia Davis, courtesy Department of Library Services, American Museum of Natural History, New York.

Samples commissioned by Elsie McDougall from Romalda Olguín

There are two groups of samples from Señora Olguín commissioned by McDougall, one with only stitch resist and the second with both stitch and tie resist. In the first group, with stitch resist only, there are three rather different examples, of which two (figs. 15-17, Table II, 6, 7) have already been discussed. The third (Table II, 8) was given by McDougall to the Pitt Rivers Museum, Oxford. The three cloths are generic rectangles, approximately 60 centimeters long and 55 centimeters wide. Since they are opened out and flat, they were probably intended to exemplify aprons, as also suggested by their design. They are similar in patterning and have had the resist material removed. The resist-binding techniques used are stitched straight and stitched over a fold (fig. 14). The Pitt Rivers textile has the date "5 DE DIC 1936." McDougall says the letters and date were given by the local schoolteacher to Señora Olguín, who was illiterate (McDougall ms.b). The dyes are synthetic in all the sampler cloths. The Pitt Rivers example is magenta, the example in figures 15-16 is red, and the one in figure 17 is overdyed with blue, giving an uneven and murky purple. No prior guide marks were used in the process, according to McDougall. Señora Olguín made the folds and stitched in the draw cord, with the cloth becoming increasingly misshapen. The puckers were then tightly compressed using the maguey thorn awl and the draw cord was knotted to hold the puckers.

The long draw cord served as a handle when the cloth was dyed. McDougall also ex-plains the process necessary for a succession of dyes (McDougall ms.b).

The second group of samples commissioned by McDougall is composed of four pieces, three at the American Museum of Natural History (figs. 18, 19, Table II, 2, 3, 4), and the fourth given by McDougall to the Peabody Museum of Archaeology and Ethnology, Harvard (Table II, 5). These are all similar in stitch-resist and tie-resist patterning. Each specimen is approximately 54 centimeters long by 41 centimeters wide and has the generic characteristics described above. In two of the American Museum pieces, one (65/4706a) is the tied version of the other (65/4706b), left so that the tying material and type of tie could be related to the design on the untied example. The technique of stitched over a fold, which in other examples was used to produce vines and leaves, is used here to make letters, such as "T J". McDougall says that these were also given to Señora Olguín by the local schoolteacher. The red diamond shapes with white, purplish, or blue centers are made with tie resist. There are some pure blue areas, but the background became a somewhat muddy purple as a result of her dye usage.

The other two samples in this group, the one in figures 18 and 19 and the Peabody Museum example, are generically the same, with stitched binding in different configurations. The piece in figures 18 and 19 is red, while the other is red overdyed with blue, resulting in a darker purple. McDougall notes that both are dyed with synthetic dyes. Both are partially undyed so that the relation of the design to the puckered pleating (pliegues) can be seen.

A piece in apron form (Table II, 11) in the Museo Nacional de Antropología in Mexico City resembles in all aspects of material and technique one of those McDougall commissioned from Señora Olguín (fig. 17, Table II, 7). The white cloth was first dyed red, with additional stitching for a solid red and unstitching of some of the other white so that with the final blue dye, there are some blue designs on the murky purplish background. The apron, given the date 1956, comes from the Ranchería de Guadalupe, Zimapán, Hidalgo.14 In contrast to the other aprons, which have a drawstring and very narrow hem, this one and the two acquired by Johnson and Christensen were unsewn and were probably never worn. Earlier, in 1949, Bodil Christensen and Irmgard W. Johnson visited the Otomí region of Hidalgo. Among other places, they went to Guadalupe, near Zimapán, gathering information on dyes. Señora Olguín was also their informant (Irmgard W. Johnson, letter to author, 17 February 2000). They each purchased an apron, similar to the one commissioned by McDougall, from Señora Olguín (see Table II, 9, 10).

McDougall hypothesized that the apron represented a simplified and less labor-intensive evolution than the skirt, which had required considerably more weaving and resist dyeing. Her two-panel piece dated 1930 (figs. 10-11, Table II, 1) explains why she entertained this idea. McDougall acquired it in Ixmiquilpan, Hidalgo, and places its provenience in the northern part of Hidalgo. She calls it an "apron cloth of two panels, corresponding to six required for a skirt. Reasonably the apron cloth represents persistence of the skirt in reduced labor form" (McDougall ms.b). The panels are woven in coarse white wool and sewn together. The length of each panel is 92 centimeters. The selvedges are in the seams. Thus, the loom width is 57 centimeters. Probably one web was woven and then cut into shorter lengths. A bottom border pattern like the skirts is all in stitch resist. No prior guide marks are evident. Care is taken in matching the pattern over the seam, confirming that the panels were dyed separately and then sewn together. There is no other design on the cloth, and the dye is a dark blue, said by McDougall to be native indigo.

The above textiles collected by McDougall in 1936-37 are the most extensive of their type collected in Hidalgo. With the additional piece from 1956, they show conclusively that the process was known and practiced by Otomí in that area. McDougall, based on her collecting in the 1930s, states that in Mexico, only in Zimapán, Hidalgo, and Vizarrón, Querétaro, were both techniques-pre-weaving bound-yarn resist (ikat) and resist on finished cloth present and used. Bound-yarn resist alone can be found elsewhere but these were the only places where both were done (McDougall ms.b). However, none of McDougall's stitch-resist and tie-resist textiles is from Querétaro. Despite her interest in the conjunction of resist techniques and her knowledge that they probably existed in Querétaro, McDougall did not at that time pursue her research there, possibly because she was self-financed and traveling alone. By the end of the 1930s, her poor health and failing eyesight precluded further travel.



Fig. 20. (a) Irmgard W. Johnson taking notes while Doña Sixta works, Vizarrón, Querétaro, 1953. Photograph by and courtesy of Guy Stresser-Pean.



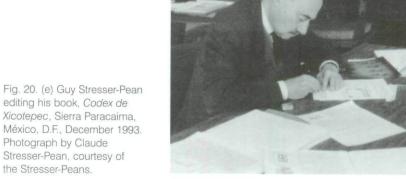
Fig. 20. (c) Bodil Christensen, Santa Barbara, Municipio de Cadereyta, Querétaro, January 8, 1953. Photograph by and courtesy of Guy Stresser-Pean.



Fig. 20. (b) Irmgard W. Johnson, Coyoacán, Mexico City, July 2001. Photograph by Pamela Scheinman.



Fig. 20. (d) Bodil Christensen, examining coyuchi (brown cotton), March 1978. Photograph by and courtesy of Irmgard W. Johnson. Christensen died in 1985.



editing his book, Codex de Xicotepec, Sierra Paracaima, México, D.F., December 1993. Photograph by Claude Stresser-Pean, courtesy of

Field Research in Querétaro during the 1950s

The examples of stitch-resist and tie-resist textiles from Querétaro are from the communities of Vizarrón de Montes and Sombrerete, Municipio de Cadereyta (Tables III and IV). They include ten skirts, a single panel, a sampler, a cotton scarf, and three *jorongos*, locally called *jergas* (an opensided overgarment for men with an opening in the center for the head).

The documentation on the Querétaro communities is provided by Irmgard W. Johnson. She met Elsie McDougall in the mid-1930s at the house of the British consul, Mr. Constantine George Rickards (Irmgard Weitlaner Johnson, phone conversation with author, 16 March 2002). She had traveled extensively in Mexico with her father, Robert Weitlaner, and Bernard Bevan. During the summer of 1949, while a graduate student at the University of California, Berkeley, Johnson returned to Mexico. She and Bodil Christensen, a Danish scholar passionate about textiles, traveled to Hidalgo. They were self-motivated and self-financed. Among other research, they interviewed Señora Romalda Olguín about dyes, aprons, the tie-resist and stitch-resist techniques, yarn-resist, and double weaves for bags (morales) (Johnson ms.; Irmgard Weitlaner Johnson, letter to author, 17 February 2000). After receiving her Master's degree in 1951, Johnson returned to Mexico, and through extensive fieldwork in all parts of the country, she increased her comprehensive knowledge of Mexican textiles. She and Christensen traveled to Querétaro before 1953. Johnson (fig. 20a, b), Christensen (fig. 20c, d) and Guy Stresser-Pean (fig. 20e) worked in Vizarrón for several years, starting in 1953, under the auspices of the Instituto Nacional Indigenista (Irmgard Weitlaner Johnson, letters to author, 29 October 1998, 19 April 1999; Johnson ms.).15

Johnson's documentation included careful attention to process and identification of the artisan, Doña Sixta Trejo Zamorano (fig. 21). Johnson characterized Doña Sixta as one of the few older Otomí women who knew the stitch-resist and tie-resist processes (Johnson 1971, p. 347). Johnson comments that although most women dressed in mestiza outfits, some wore the tie-dyed skirts indoors as protection against the cold, though this custom was dying out (fig. 22). There is a claim that the skirts were worn at fiesta (Johnson ms., p. 4). Unlike the indigenous wraparound type of skirt (*enredo*), all of these skirts are



Fig. 21. Doña Sixta Trejo Zamorano, tying knots for resist. Vizarrón de Montes, Querétaro, January 1953. Photograph by Irmgard W. Johnson.



Fig. 22. Vizarrón villager wearing skirt (Table III, #2). This skirt is said to have been made twenty years earlier by an aunt of Doña Sixta. Collected by Irmgard W. Johnson. Vizarrón de Montes, Querétaro, January 1953. Photograph by Irmgard W. Johnson.

Fig. 23. Doña Sixta using red clay powder (tepalcate) with stencil for marking the pattern on the panel for the skirt. Vizarrón de Montes, Querétaro, January 1953. Photograph by Irmgard W. Johnson.





Fig. 24. Doña Sixta using a stick (otate) for marking the diamond-shaped ties. Vizarrón de Montes, Querétaro, January 1953. Photograph by Irmgard W. Johnson.

Fig. 25. Doña Sixta using a small piece of cane (*carrizo*) for marking circles. Vizarrón de Montes, Querétaro January, 1953. Photograph by Irmgard W. Johnson.





Fig. 26. Doña Sixta using a large piece of cane (carrizo). Vizarrón de Montes, Querétaro, January 1953. Photograph by Irmgard W. Johnson.

tailored in European style. There are two methods of construction. In one (falda), the sewn-together panels are gathered directly into the waistband. In the other (sabanilla), the sewn-together panels are gathered into a piece of muslin, about 20 centimeters long, which is then sewn over to make an opening for a drawstring, or alternatively made into a waistband. Sometimes a color other than white is used for the muslin.

These textiles collected in the early 1950s exhibit common features. The Museo de Antropología in Mexico City houses some panels not realized as finished garments. Four panels, sewn together but not yet assembled into a skirt, show a white design on a red ground (Table III, 8). Possibly the dye is wild cochineal (grana salvaje). Another is a single panel, likely one of four, with a white, red, and blue design, made by Doña Sixta, the producer of Johnson's skirt (Table III, 7). The Johnson collection skirt and that collected by Stresser-Pean, which is in the Museé de l'Homme, Paris, also each have four panels (Table III, 2, 3). Both of these are in the sabanilla style: sewn into a muslin strip before adding the waistband. They all have a loom width averaging 58 centimeters. The yarn is a white wool, singles, Z-twist with rather coarse balanced weaves. All these textiles share similar field and border design motifs (see below, Techniques in Querétaro) created by stitch resist and tie resist with a similar color palette. Furthermore, the nineteenth-century Coronel Collection example and the two china poblana skirts have the same features.

Techniques in Querétaro

In January 1953 Johnson documented extensively the techniques of creating the stitch-resist and tie-resist motifs and the dyes used in Vizarrón de Montes, Querétaro (Johnson ms.). Her informant, Doña Sixta, had learned the patterns from her aunt and repeated them from memory. Panel by panel, Doña Sixta drew the entire design first, using a stenciling technique. The pattern was drawn on paper and its outline pricked through with a needle. The paper was placed on the cloth, and a bundle filled with powdered red clay (made from shards), called tepalcate in Otomí or almagre in Spanish, was passed over the tiny holes (fig. 23). With the vague outline delineated by the powder, Doña Sixta then painted along the outline. The marking liquid was the same material (powdered red clay) mixed with water. The long diagonal lines were drawn with a ruler,

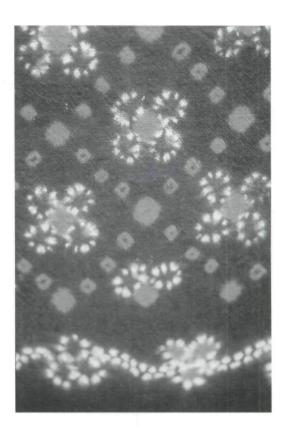
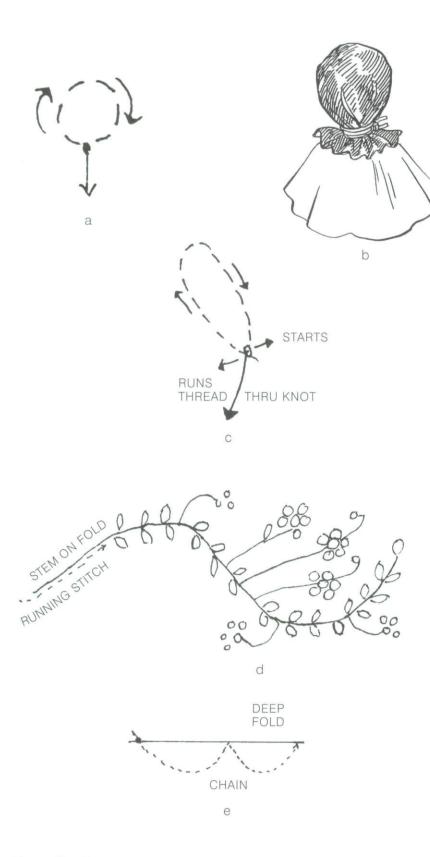


Fig. 27. A field pattern with a diamond lattice composed of different-sized tie-resist diamond shapes, and flower-like motifs in the lattice openings. Detail of the skirt collected by Irmgard W. Johnson and illustrated in figure 22. Vizarrón de Montes, Querétaro, January 1953. Photograph by author.

and the placement of the little diamond ties along these lines was marked with the end of a stick (otate) (fig. 24). Pieces of hollow cane (carrizo) of different diameters were also used for stamping patterns (figs. 25, 26) (Johnson 1971, pls. 192, 193, 197). Doña Sixta used a thimble to draw the marks for the petals of large flowers and a steel needle, with fatter or thinner ixtle thread, depending on the requirements of definition needed in the design. She sometimes wet the ixtle with saliva. It was important that all the threads were left loose until ready to tighten and that tightening occurred in stages.

A field pattern is usually but not always present. One of the simplest patterns is rows of white dashes (fig. 6). Each dash is made by a separate stitch with *ixtle* fiber, which is then pulled tight and knotted. The field pattern of the skirt collected by Johnson in 1953 has diagonals of red tie-resist diamonds forming a diamond lattice (fig. 27; see also fig. 32) (Johnson 1976, vol.1/I, pl. 25, no. 56). Within these areas, stylized four-petal flowers were sewn with fine cord, which was often wet with saliva. For the flowers, the red center—or, as the shape is called, *uvas* (grapes) (Johnson ms., p. 2)—is done first. Beginning with a knot, about five running stitches are made around the outline with two-ply *ixtle*

Fig. 28. Drawings and descriptions of running stitch placement for (a) *uvas* (grapes), a circular area, (c) petal, (d) stem and (e) chain (Johnson ms.); (b) a capped circular area (like an *uva*) (Lechuga 1979, p. 3). Size and shape of the enclosed area is variable.



cord. The cord is then run through the knot and pulled so that the cloth, called cabeza (head), stands up. It is then wrapped five or six times until entirely covered with the continuation of the sewing cord. Sometimes it is covered with a leaf or a piece of oilcloth. After the cabeza has been wrapped, it is secured using a square knot (nudo de hombre). The finished binding is called encuetada (bound with a cord) (fig. 28a and b). Petals are created in the same manner except for the shape and number of stitches in the outline (fig. 28c). Important variations can occur with the manipulation after the pulling-up of the running stitch. Sometimes the material is pushed to the underside and sewn and wrapped more with the ixtle sewing cord, to create additional resist. If the material is not wrapped, only the outline of the design is present in the pre-dyeing color.

In the skirts studied, a border is always present, but with variations. The skirt in figure 22, collected by Johnson, is representative. There is a narrow undulating vine with flowers and leaves above and below. In the center is a much larger vine motif of floral sprays, offshoots of flowers, leaves and stalks leaning inward (fig. 29). The design was stenciled on the cloth (fig. 30). Doña Sixta began sewing the stem, choosing to use a thicker thread. To make a line pattern, the material is folded and sewn with a straight running stitch (fig. 28d). To make a chain pattern, the fold is deeper and the running stitch undulates (fig. 28e). The smaller stems, petals, and other shapes (fig. 28a-c) are stitched last but drawn up first.

In 1953, Johnson reported the use of synthetic dyes with recollection of recipes for indigo and cochineal. She also noted that the dyeing process causes some embossing of the fabric because of the texture of *ixtle* (Johnson ms., pp. 1–2).¹⁷

Corroboration that these techniques existed in Vizarrón in the 1930s is found in the documentation for a skirt and an extra panel in the collection of the San Diego Museum of Man (fig. 31a and b; Table III, 12). Mrs. Michael Crichton, while in Vizarrón in the spring of 1970, bought a narrow two-panel wool skirt, sewn with deep darts into a cotton waistband. The extra identical panel and the poor condition indicate modification of an earlier garment. The skirt was purchased from Señora Leonor Vega Pérez, who said she had purchased it at least thirtyeight years previously, about 1932, from the maker, Doña María del Carmen Zamorano, the daughter of Doña Sixta Trejo, whose work has

been described above in Irmgard W. Johnson's fieldwork of 1953. Doña Maria remembered weaving the material on a backstrap loom and said that her mother, Doña Sixta, had learned from her mother. Señora Vega called the skirt tela amarrada (tie-resist cloth) and claimed that such skirts were worn at festivals, not weddings. She said, quite inaccurately, that none had been made for thirty or thirty-five years. 18 The description given by Señora Vega of the use of the paper pattern to mark the design and choice of ixtle for the binding element agrees with Johnson's documentation of the technique in 1953. However, this skirt has only a border pattern, showing white on a dark blue background, which was said to be indigo.

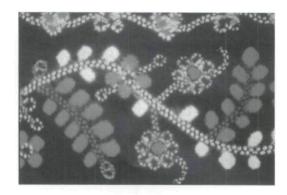
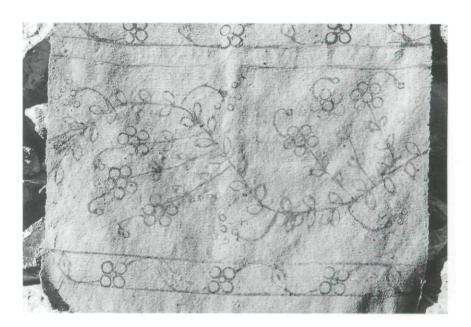


Fig. 29. Detail of the border pattern on the skirt collected by Irmgard W. Johnson (Table III, #2). Vizarrón de Montes, Querétaro, January 1953. Photograph by Irmgard W. Johnson.







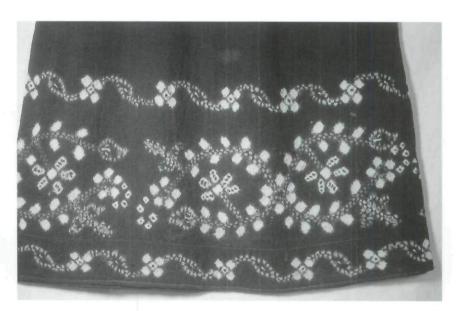


Fig. 31. (a) Skirt and (b) detail (Table III, #12), attributed to Doña María del Carmen Zamorano, daughter of Doña Sixta. San Diego Museum of Man 1970–47–1. Photograph courtesy of San Diego Museum of Man.

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Additional resist-dyed skirts from Querétaro

Thanks to the fieldwork of Johnson, Christensen¹⁹ and Stresser-Pean in the 1950s it is possible to verify the attribution of skirts said to be from Vizarrón, Querétaro. They characteristically have relatively elaborate designs, and most are *sabanilla* style and employ three colors.

Three items not collected in the field meet the above criteria. Thus, in the San Diego Museum, Johnson and Christensen identified a skirt purchased from Victor Fosado in Oaxaca in 1969 as being from Vizarrón (fig. 32; Table III, 13). This white and blue wool four-panel skirt is not sewn into a waistband. Señor Fosado stated that it was one of the last of its type made, being from the early twentieth century. It is quite similar to those collected in the 1950s. The second example is housed in the Museo Nacional de Artes e Industrias Populares in Mexico City. It is a sabanilla-type skirt which has been described as an old Otomí-mestiza garment from Vizarrón. It has been mentioned as being among the older examples of all the samples studied (Table III, 1). Wider and longer than any other, it is of a finer plain weave in wool. Eight panels, 60 centimeters wide (loom width) by 80 centimeters long (plus 18 centimeters of white muslin at the top), are seamed with whip stitch. The textile is

Fig. 32. Skirt purchased from Victor Fosado, Oaxaca, 1969. Its design is remarkably similar to the skirt in figure 22, collected by Irmgard W. Johnson, Vizarrón de Montes, Querétaro, January 1953, but the colors are blue and white. San Diego Museum of Man 1970–10–1.



very heavy owing to the quantity of material. The content of the pattern and the particular techniques of stitched over a fold and tied are as described in Johnson's field notes. The skirt has a white design on a dark blue background, likely indigo, with a technical refinement in tying and dyeing. There were double ties around the diamonds so that when the outermost tie was removed after one or more dippings in the blue dye, a medium light blue showed around the diamonds. The third item, a skirt collected in the 1950s (fig. 9 and cover; Table III, 11) is in The Textile Museum collection. Irmgard Johnson, on seeing the four-paneled wool skirt with a white design on blue, confirmed its origin in Vizarrón. It does not appear to have ever been sewn at either the upper or lower edges apart from the overcasting of the raw ends, which was done before dyeing.

Johnson also identified a skirt (Table III, 14) in the Florence Dibell Bartlett Collection in the Museum of International Folk Art in Santa Fe, as being from Vizarrón (Parrott 1957). Acquired by Bartlett in Mexico and given to the museum in 1951, it is certainly unusual. The skirt is made from a single loom length with the warp horizontal so that the "length" of the skirt, 85 centimeters, is the loom width of the weaving. There is only one seam, bound and rolled like a French seam and tapering toward the bottom, plus some additional darts. There is no waistband but instead a drawstring in a muslin facing. Since the pattern was stitched and tied all at one time, there is pretty good matching at the seam. The distribution of the pattern is different from the other examples. The geometric field pattern is one-third of the length. The border pattern is two-thirds with a double chain pattern top and bottom bounding the vine and flower design. The dye sequence is a golden yellow, red, and very pale blue, giving a brown/red background with a greenish cast around some of the yellow. Because of the way in which some of the stitching is compressed, the dyeing is uneven. That is, the yellow and blue did not interact with red, so the background is light red in some places, brownish in others. The coloring is complex, and because of the three dyeings, the palette is very different from that of any of the other examples studied.

A blue skirt from Vizarrón, made in 1974, is in the collection of the Museo Serfín de Indumentaria Indígena (Table III, 10). Another, cochineal red, with blue overdyeing, is at the Museo Nacional de Artes e Industrias Populares (Table III, 9). The two are so similar in material,

weave, pattern, and garment construction that they could well have been made by the same person. The cloth was woven in one long piece, with a width of approximately 55 centimeters. The length was cut into three sections, each about 70 centimeters long. The pieces were stitched together flat, stitch- and tie-resist dyed and then sewn into a waistband. The layout of the design and the techniques of execution are the same but the motifs are enlarged and more haphazardly placed than in the other skirts discussed. These are the skirts with the latest date examined. The refinement of earlier examples is not present. It seems to be the case that the practice of these techniques had almost vanished by the 1970s.

Ruth Lechuga and Marta Turok: Research and Rescue Project in Querétaro during the 1970s

During Holy Week of 1977, Dr. Ruth Lechuga (fig. 33a), then curator at the Museo Nacional de Artes e Industrias Populares, and Marta Turok (fig. 33b) were in El Doctor, Querétaro, where they made inquiries about artisans who knew the old textile resist techniques. With difficulty, they eventually located Señora Dolores Aguilar (fig. 34) in nearby Sombrerete. Señora Aguilar lived at a remote *ranchería*, Chavarría, a hamlet high in the Sierra Gorda, and made the two-hour trip to sell *pulque* (a fermented alcoholic drink made from the juice of various magueys) in Sombrerete. She remembered these resist techniques for which she used the word *amarrar* (to tie, bind) (Lechuga 1979, pp. 11–12).²⁰

Although Señora Aguilar had not worked in this technique for twenty years, Lechuga and Turok were able to collect a sampler made by her. She did not draw the design first, and Lechuga comments that the design depicting a garland of flowers was simpler than those previously known from Vizarrón (Lechuga 1979, p. 19). The sampler illustrates the stitched technique (fig. 35, Table IV, 1). The pattern is seamed with whip stitch on a rather large (121 x 97 cm), coarse wool, plain-weave textile. The stitches and ties were left in place and half was left white, while the other half was dyed, probably with a synthetic dye. On part of the dyed cloth, the resist elements were untied by Lechuga so that the process could be seen and explained. The stitching material is unspun ixtle. A particularly notable example of stitched with a knot is shown by the little white



Fig. 33. (a) Dr. Ruth Lechuga, Tepoztlán, December 2000. Photograph by Marta Turok.



Fig. 33. (b) Marta Turok, 2002. Personal collection of Marta Turok.



Fig. 34. Señora Delores Aguilar on the backstrap loom, weaving a *jorongo* (open-sided poncho) with the twill structure. Photograph by Dr. Ruth Lechuga, 1977–78.

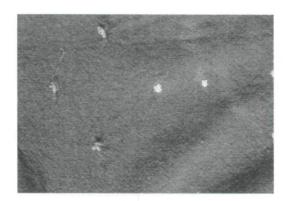


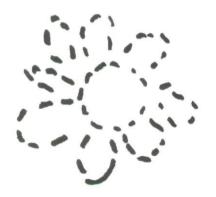
Fig. 35. Detail of sampler showing small stitch resist. Commissioned from Señora Delores Aguilar, 1977–78, by Dr. Ruth Lechuga. Museo Ruth Lechuga de Arte Popular, México. Photograph by author.

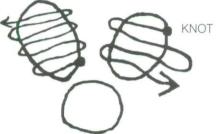


Fig. 36. (a) View showing design layout of scarf, which could be used as a table runner, made in the rescue workshop, sponsored by the Museo Nacional de Artes e Industrias Populares, Mexico City, and the Instituto Nacional Indigenista de Tolimán, Querétaro, 1978. Collection of Marta Turok. Photograph by author.



Fig. 36. (b) Closeup of motif on the scarf. Collection of Marta Turok. Photograph by author.





PETAL OR LEAF ANOTHER METHOD

dot made in the tight tying of the knot with a single stitch using the *ixtle* cord (fig. 35).

Dr. Lechuga was very active in helping to establish a revival workshop; the project was begun in the summer of 1977 and sponsored by the Museo Nacional de Artes e Industrias Populares and the Instituto Nacional Indigenista de Tolimán, Querétaro (Marta Turok, e-mail to author, 22 April 2002). Señora Aguilar was engaged as a teacher to teach others so that the tradition of the region would not be lost (Lechuga 1979, p. 19). Initially they were given cochineal to work with. Lechuga returned three times and Turok twice. The Museo Nacional de Artes e Industrias Populares bought pieces once or twice more and then stopped when the workshop requested more funds. There was little follow-up and the workshop died out (Turok, e-mail to author). I saw a scarf (fig. 36a, Table IV, #2) from the collection of Marta Turok, whom I interviewed on 23 December 1996. It is long and narrow, of factory-made fine cotton, and has a half-drop layout of the motif of a single multipetaled flower (fig. 36b), sewn with a very fine thread of ixtle, white on a light green background (fig. 37). Cotton fabric was chosen instead of handwoven wool because it was available, less labor intensive, and therefore less expensive, and presumably more marketable (Turok ms.). The revival did not continue, the lack of a market being one factor. Dr. Lechuga says: "About why the technique stopped being produced, it is difficult to judge. Unfortunately, when a machinemade material becomes available, many people stop doing so much work to produce all this complicated weaving. Discrimination also makes many abandon their specific costume in order to look non-Indian. For so many years, the Government had tried to incorporate Indians into a supposed universal Mexican culture and did not make it easy for them to conserve their own cultures. Sometimes, also, new working opportunities make it easier to earn a living. Why didn't the promotion of the museum last? Partly because we could not follow up by going there frequently; partly because the product was expensive and didn't arouse enough interest in our clients. Probably also the weavers lost interest because they found other ways of subsistence"

Fig. 37. Diagram of flower motif in Marta Turok's scarf (fig. 36b). In the technique for the petal and the center, the sewing with very fine thread goes back and forth using a running stitch. There are no or few needle holes at the top or bottom of the petal. The stitches are very close together. Then compression occurs separately across the petal and circular center. The pattern of stitches is shown for the entire flower. Notes from a taped interview with Marta Turok, 23 December 1996. Photograph by author.

(Ruth Lechuga, fax communication to author, 25 April 2001).

Lechuga and Turok also made a valuable contribution by documenting a rare variant of stitch resist on a backstrap-loom woven wool textile by Señora Aguilar in June 1977 (Lechuga 1979, pp. 13-18). Johnson and Christensen had purchased a jorongo with stitch resist in Los Juárez, near El Doctor, Municipio de Cadereyta, Querétaro, but they did not have the opportunity to document the process. They comment that similar jergas amarradas were made in Sombrerete and La Laja, Querétaro (Johnson ms., 10 January 1953 entry). Señora Aguilar, on being asked for something amarrado, brought out a wool jorongo or jerga (an open-sided poncho) that she had made (Table IV, 3, 4, 5). It is woven in a warpfaced 2/2 twill weave with stripes of equal width in the natural white and brown of the wool. The weft is brown wool. Jerga is a Spanish word normally referring to a 2/2 twill weave wool fabric, which explains the local usage for this garment. Lechuga commissioned a similar jorongo from Señora Aguilar (fig. 34). Lechuga and Turok bought fleece for Señora Aguilar to spin and agreed to return three weeks later (Turok ms.). After weaving, lengths about an inch high, having the width of the selected white stripe, are bound over with a needle and moistened ixtle in an overlapping spiral in the white stripe at regular intervals (fig. 38) and firmly knotted (fig. 39). This is done to the white stripes in a half-drop





Fig. 38. Señora Aguilar binding the pattern by sewing. The yarn is passed around a desired length of woven white stripe. Photograph by Dr. Ruth Lechuga, 1977–78.



Fig. 39. The yarn, wrapped around the desired length in the white stripe of the weaving, is then firmly knotted. Photograph by Dr. Ruth Lechuga, 1977–78.

Fig. 40. The cochineal insects are ground in a mortar. Photograph by Dr. Ruth Lechuga, 1977–78.

pattern. Then the entire garment is dyed, with either red or blue dye. According to Señora Aguilar, synthetic dyes were used, although the *jorongo* collected by Dr. Lechuga is dyed with cochineal (figs. 40, 41a-b) (Lechuga, fax communication to author). Afterward, the brown stripe is a darker hue of the dye color, and the white stripes have a regular layout of white dots on a stripe of the dye color, in this case, red. The effect is like a simple bound-yarn resist but a bit crisper (fig. 42).²¹ Questioning informants, Lechuga confirmed that this technique was known and done by others in that area (Lechuga 1979, p. 14).

The history, continuity, decline, and disappearance of a set of resist-dyeing techniques make a case study in the evanescence of local traditions as societies modernize. There has been no further research since the 1970s in Hidalgo and Querétaro indicating any persistence of tieresist and stitch-resist techniques. In addition to the records from those still living who worked in the field, what remains are collections and archives. These will help preserve a history for those in the future who may wish to recover this lost tradition.



a

Fig. 41. (a) Taking out the textile after dyeing it; (b) pressing out the excess dye liquid. Photographs by Dr. Ruth Lechuga, 1977–78.



b

Acknowledgments

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About the author

Virginia Davis works with *ikat* and other resist techniques, both as an internationally exhibited artist and from a technical, historical, and ethnographic point of view. Her M.A. in sociology/anthropology is from the University of Illinois, Urbana. Her interest in Mexican culture began while she was an assistant to Oscar Lewis on an anthropological field trip to Mexico.

Starting in 1988, she organized the Elsie McDougall Archive in the Department of Anthropology at the American Museum of Natural History, New York. In addition to her article (Davis 1991), she produced a video document with Pamela Scheinman, *Fidel Diaz Valencia, Master Weaver* (1992) about the last bound-yarn resist *rebozo* weaver in Oaxaca.



Fig. 42. *Jorongo* (open-sided poncho). Turok conjectures that this garment may have been made by Señora Aguilar (Turok ms.). Collection of Virginia Davis. Gift from Pamela Scheinman, who purchased it in the store of the Museo Nacional de Artes e Industrias Populares in the early 1980s. Photograph by author.

Abbreviations

AMNH American Museum of Natural History, New York

LACMA Los Angeles County Museum of Art

AAPA America, Africa, Pacific, Asia (department within The Brooklyn Museum)

MNAIP Museo Nacional de Artes e Industrias Populares, Mexico City

MNA Museo Nacional de Antropología, Mexico City

IWJ Irmgard Weitlaner Johnson

EMcD Elsie McDougall

SDMM San Diego Museum of Man

RvV Rijksmuseum voor Volkenkunde, Leiden, The Netherlands

TABLE I Oldest Examples of Tie Resist and Stitch Resist

	Collection	Specimen Number	Provenance	Group	Object	Date	Size WIDTH X LENGTH	Yarn	Count, WARP	per cm WEFT
1	Coronel, LACMA 1904–05	A.110.59-1101	Mexico		Originally skirt, now flat rectangle	1840s- 1873, 1870's	270 x 91 cm (6 panels: each 45 x 71 cm plus muslin band: 270 x 20 cm)	Warp and weft are wool, Z singles, well spun, even	13	10 - 04
2	Luis Márquez, Museo Indumentaria Mexicana Ramay, Claustro de Sor Juana	#48, 141 Acquired from Doña Margarita Portillo Collection	Puebla, Mexico	Mestiza	Skirt	1847/60?	4 panels: each 48 x 74 cm			
3	Luis Márquez, Museo Indumentaria Mexicana Ramay, Claustro de Sor Juana	#49, 144 Acquired from Doña Margarita Portillo Collection	Mexico, D.F.	Mestiza	Skirt	1847/60?	4 panels: each 48 x 74 cm			
4	Elsie McDougall, AMNH	65/5158	Zacatecas?	?	Skirt	19th century?	6 panels: each 56 x 76 cm	Warp and weft are wool from local sheep	12	10 - 11
5	Brooklyn Museum, AAPA	43.195-17	Zimapán region, Hidalgo?	Otomí	Skirt	19th century?	6 panels: each 56 x 76 cm with cotton band: 336 cm around hem, 87 cm	Warp and weft both wool	13	10

The panels were sewn together with woolen thread, the selvedges in the seams indicating a weaving width of 45 cm. It is dyed in pairs as evidenced by the presence or not of dye on the connecting sewing thread. The design, red and white motifs on blue, follows dye sequence of red, blue.

^{2, 3} On both skirts, the design motifs have sequins superimposed, recent in origin. Both have field and border patterns. Number 2 is red and white on blue; number 3 is white on red.

^{4, 5} Field and border patterns, white on blue ground, indigo. Number 4 was purchased by McDougall at Sanborn's, Mexico City, 1933.

TABLE II Resist Textiles from Hidalgo

	Collection	Specimen Number	Provenance	Group	Object	Date	Size WIDTH X LENGTH	Yarn	Count, WARP	per cm WEFT
1	Elsie McDougall, AMNH	65/5157 acquired 1936-37	Ixmiquilpan, Hidalgo	Otomí	Apron?	1930	114 x 92 cm (2 panels: each 57 x 92 cm)	Warp and weft are white wool, Z singles, well spun, even	9 - 10	6
2	Elsie McDougall, AMNH	65/4706a	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí	Sampler	1936	Compressed, can't determine	Handspun wool, well spun, twill weave	12 - 13	10
3	Elsie McDougall, AMNH	65/4706b	Ranchito Guadalupe, Zimapán, Hidalgo	Mestiza	Sampler	1936	41 x 54 cm	Handspun wool, well spun, twill weave	12 - 13	10
4	Elsie McDougall, AMNH	65/5154	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí	Sampler	1936	Compressed, about 36 x 46 cm	Handspun white wool, Z singles	11 - 12	8 - 9
5	Peabody Museum, Cambridge, MA	Acc.#43-35 Cat.# 20/1 49 1 27	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí, Mestiza	Sampler	1937	Compressed	Handspun white wool, Z singles	11 - 12	8 - 9
6	Elsie McDougall, AMNH	65/5155	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí	Weaving, apron?	1936/37	53-55 x 59-60 cm	Handspun white wool, Z singles	11 - 12	9 - 10
7	Elsie McDougall, AMNH	65/5156	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí	Weaving, apron?	1936/37	53-55 x 59-60 cm	Handspun white wool, Z singles	11 - 12	9 - 10
8	Elsie McDougall, Oxford University, Pitt Rivers Museum Oxford, England	1946.6.9	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí	Weaving, apron?	1936/37	53-55 x 59-60 cm	Handspun white wool, Z singles	11 - 12	8 - 9
9	RvV, Leiden Irmgard Weitlaner Johnson Collection	RMV 5946-50	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí	Apron	1949 made by Señora Olguín	33 x 49 cm	Warp and weft handspun white wool		
10	RvV, Leiden Bodil Christensen Collection	RMV 5075-574	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí	Apron	1949 made by Señora Olguin				
11	MNAIP (in MNA)	XVII-W-22-1. Clave 2522	Ranchito Guadalupe, Zimapán, Hidalgo	Otomí	Apron	1956	45 x 76 cm	Handspun white wool, Z singles	11 - 12	7 - 8

- This skirt has only a border pattern, white motifs on blue ground. Care was taken in matching pattern over seam. EMcD says "native indigo, vegetal".
- 2, 3 Done by the "ambitious weaver" (EMcD), Romalda Olguín. EMcD says "The dye sequence is red, then blue; the super-imposition of the two dyes gives a murky brown instead of rich purple...the specimen is spoiled 1. By weaving the cloth twill instead of plain weave of fairly open absorbent texture, 2. By use of synthetic dyestuffs in place of traditional dyes . . . ". (McDougall, Notebook: *Plangi* (Tie-Dye)).
- 4, 5 Also done by Romalda Olguín. EMcD says "cochineal" for 4. Since red is the first dye in the sequence 4 probably precedes 5. EMcD: "In 1936, Romalda Olguín, who spoke only Otomí, did both *plangi* and *ikat* using indigo and cochineal. She wore a *quechquemitl...*used a steel needle in 1936...used a maguey thorn as an awl and to regulate puckers." EMcD says of 5 in a letter, dated 12/4/43 (X File 43-45, Peabody Museum), to Isabel Guernsey: "not my best *plangi* specimen".
- The tag attached to this cloth in EMcD's handwriting says "This is considered basic design and 65/5156 its elaboration." This cloth has geometric intertwined lozenges in white on red. The piece was published by Start, 1948 with an explanation of the technique and a diagram of this piece drawn by EMcD on pp. 99-101, with the cloth illustrated in pl XVI, and Señora. Olguín pictured in pl VIII wearing a tie-resist apron, while her daughter is tying a yarn resist warp.
- 7 This is likely an apron. The vine and leaf motifs are white, light blue, and red on an overall purple background.
- The color of this piece is white vine and leaf design on magenta backgound from an aniline dye. An additional design, the date "5 DE DIC" appears in stitch resist.
- 9, 10, 11 Red and blue motifs on a murky purple, like 7 in pattern. Numbers 9 & 10 were purchased from Señora Olguín, see explanation of design, figure 14.

TABLE III Resist Textiles from Querétaro, 1950s

	Collection	Specimen Number	Provenance	Group	Object	Date	Size WIDTH X LENGTH	Yarn	Count, WARP	per cm WEFT
1	MNAIP, Mexico City	Hoja 3 Num 12 T5	Vizarrón, de Montes, Mun. de Cadereyta, Querétaro	Otomí/ Mestiza	Skirt (sabanilla style)	Old	480 x 78 cm 8 panels: each 60 x 80 cm +18 cm wide white cotton cloth at top	Warp and weft are fine white wool, Z singles, well spun, even	16 - 17	10 - 13
2	RvV, Leiden Irmgard Weitlaner Johnson Collection	RMV 5946- 60	Vizarrón, de Montes, Mun. de Cadereyta, Querétaro	Otomí	Old style skirt (sabanilla style)	1953	174 x 80+ cm 3 panels: each 58 x 71 cm narrow white cotton band at top	Handspun wool, well spun, twill weave	10	10
3	Musée de l'Homme Collected & given by Guy Stresser-Pean	55.84.552	La baja entre Sombrerete y El Doctor, Municipio de Cadereyta, Querétaro	Otomí	Skirt (sabanilla style)	Given 1955	232 x 83+ cm 4 panels: each 58 x 83 cm narrow muslin band at top folded, cord inserted for tie.	Handspun wool, well spun, twill weave	10	10
4	RvV, Leiden Bodil Christensen Collection	RMV 5075-675	Vizarrón, de Montes, Mun. de Cadereyta, Querétaro	Otomí	Skirt panel	Bought from owner, 1/53	47 x 70 cm			
5	RvV, Leiden Bodil Christensen Collection	RMV 5075-676	Vizarrón, de Montes, Mun. de Cadereyta, Querétaro	Otomí	Woolen skirt	Bought from owner, 1/53	190 x 65 cm 4 panels: each 47+ x 65 cm			
6	RvV, Leiden Bodil Christensen Collection	RMV 5075-677	Vizarrón, de Montes, Mun. de Cadereyta, Querétaro	Otomí	Woolen skirt (?)	Bought from owner, 1/53	180 x 75 cm 4 panels: each 45 x 75 cm			
7	MNAIP, in MNA	XVII-W-22-2	Vizarrón, de Montes, Mun. de Cadereyta, Querétaro	Otomi/ Mestiza	Skirt (sabanilla style)	Fall, 1952	48 x 71 cm One rectangular web only; 3 or 4 to make up skirt, waist band added to lengthen	Handspun, hard white wool, Z singles; weft somewhat finer in diameter	12 - 13	6
8	MNAIP, in MNA	XVII-LL-22-1; Clave 2522 (416)	Sombrerete, Municipio de Cadereyta, Querétaro	Otomi/ Mestiza	Skirt, panels sewn together, not yet skirt	?	180 x 74.5 cm 4 webs: each 45 x 74.5 cm 45 cm weaving width, selvedges are side seams	Handspun white wool, Z singles	-	-
9	MNAIP, in MNA	XVII-W-221, Clave2522	Sombrerete, Municipio de Cadereyta, Querétaro Purchased, Vizarrón	Otomi/ Mestiza	Skirt (falda style)	1974	172 x 76 cm 3 panels: each 57.5 x 71 cm 5 cm waistband	Handspun white wool, Z singles	12	8
10	Museo Serfin de Indumentaria Indigena	3178-11.2-91- 439, #3178 is Spec. No.	Vizarrón, Querétaro	Otomí/ Mestiza	Skirt (falda style)	Made in 1974, acc. to Teresa Pomar	159 x 74 cm 3 panels: each 53 x 69 cm 5cm waistband	Handspun white wool, Z singles	12	8
11	The Textile Museum Washington, D.C.	1976.24.11	Vizarrón de Montes, Querétaro	Otomí/ Mestiza	Skirt	Collected in 1950's	184 x 80 cm 4 panels: each 46 x 80 cm	Handspun white wool, Z singles	12 - 13	7 - 8
12	San Diego Museum of Man	1970-47-1 A., B.	Vizarrón de Montes, Querétaro	Otomí/ Mestiza	A. Skirt B. Cloth, Rectangle	ca. 1932	A. 144 x 73 cm 3 panels: each 48 x 73 cm Each panel has a different width, pleated into waistband (32, 31, 36 cm) B. 50 x 76 cm	Handspun white wool, Z singles	13	11
13	San Diego Museum of Man	1970-10-1	Vizarrón, Querétaro identified by IWJ	Otomí/ Mestiza	Skirt	like those of 30's & 50's - IW	172 x 74 cm 4 panels: each 43 x 74 cm sewn together, no waistband	Handspun white wool, Z singles	13	11
14	Florence D.Bartlett Collection, Museum of Internat'l Folk Art Santa Fe, NM	1469	Mexico Vizarrón, Querétaro? acc. To IWJ	Otomí/ Mestiza	Skirt (falda style)	20th century	260 x 85 cm 4 "panels": each 65 x 85 cm muslin facing for drawstring	Handspun white wool, Z singles	13	12

- This skirt is heavier and has the most panels (8) of all those documented, and a finer weave. The weaving width is 60 cm. In the design which includes both field and border, is white on blue, the larger diamonds have been double tied and partially untied as the dyeing progresses. The result is a medium blue around the larger diamonds. At the top it has white cotton pleated into the waistband. Both sides of waist have approximately 40 cm tapes for fastening.
- This skirt, with field and border patterns, is white and red on a blue ground. The dyes are cochineal and indigo. It is documented in (Johnson 1971,pp. 161-269, 347-348). Catalogue card reads: "hecha por la tía de Doña Sixta, (hace unos 20 años)"
- 3 This skirt, with field and border patterns, is white and red on a blue ground. The dyes are cochineal and indigo. The selvedge is sewn into a thin muslin at the waist. The muslin is folded, a cord inserted for a tie. The dimension, 58 cm, is the weaving width.
- This skirt, with field and border patterns, is white on a blue ground. Pattern is similar to Table I, 3.
- This skirt, with field and border patterns, is white on a blue ground. It is remarkably similar to the specimen from the Brooklyn Museum (Table 1, 5).
- 6 This skirt, with field and border patterns, is white and red on a blue ground. It is similar to 2 and 3 above and to 6.
- 7 This skirt, with field and border patterns, is white and red on a blue ground. It was made by Señora Sixta Trejo. It is one web cut into four pieces, with the selvedges in the side seams.
- 8 This skirt, with field and border patterns, is white on a red ground. There are four joined webs not yet made into a skirt. Weaving width is 45 cm.
- This skirt, with field and border patterns, is white on a red ground that has the bluish cast of wild cochineal. It is made from one long web, 71 cm wide which was then cut into three pieces. Vestiges of the pencil drawn design can be seen. The motifs are somewhat enlarged, distorted, and sparser than those from earlier skirts. It is similar to 10 below.
- This skirt, with field and border patterns, is white on a blue ground. There are no pencil marks, but motifs similar to 8. Catalogue information from Teresa Pomar conjectures that the two skirts were made by the same person at the same time. One long web was woven, cut in half. One part was dyed in cochineal for one skirt and the other in indigo for the second skirt.
- 11 This skirt, with field and border patterns, is white on a blue ground.
- This skirt, with a border pattern only, is white on blue. It was purchased for the SDMM by Mrs. Michael Crichton in 1970. She bought it from Señora Leonor Vega Perez who claimed to have purchased it about 38 years ago from the maker, Dona Maria del Carmen Zamorano. (See letter S-3940-3942, SDMM). It is very similar to the floral border in Table, 3 and 5.
- 13 This skirt, with field and border patterns, is white on a blue ground. It has a layout similar to Table I, 3.
- This skirt, with field and border patterns which a dye sequence of yellow, red and blue. The background is blotchy, brown overall but reddish in some places. The design is rolled into "darts" at intervals. The design layout is similar to Table I, 3. The web apparently has not been cut, the weaving width is 85 cm, the length of the skirt. The four "panels" are stitched, tied and dyed, then rolled into "darts" so that the width will be narrow enough to gather into a waistband at the top.

TABLE IV Resist Textiles from Querétaro, 1970s

	Collection	Specimen Number	Provenance	Group	Object	Date	Size WIDTH X LENGTH	Yarn	Count, WARP	per cm WEFT
1	MNAIP	Collection Dr. Ruth Lechuga	Vizarrón, Querétaro	Otomí/ Mestiza	Sampler	1977	121 x 97 cm	Warp and weft are wool, Z singles, well hand spun, even	10	7
2	Private collection, Marta Turok		Vizarrón, Querétaro Señora Dolores Aguilar San Juan del Río	Otomí	Scarf, or table runner	July 1978–79	38 x 100 cm 39 cm wide before hem	Pretty fine, factory made cotton both warp & weft	38	26
3	MNAIP	0431 or T4	Vizarrón, Querétaro See Lechuga 1979	Otomi/ Mestiza	Jorongo without neck slit	ca. 1977	110 x 55 cm 10 cm fringe	white, & dark brown wool, Z singles, handspun	2	-
4	MNAIP	XVII-M- 22-1	Sombrerete, Querétaro	Otomí	Jorongo	ca. 1977	65 x 66 cm 9 cm fringe	Single ply, Z twist white & brown wool	-	-
5	Private collection, Virginia Davis		Sombrerete, Querétaro purchased MNAIP	Otomí	Jorongo	?	51 x 70 cm 11 cm fringe	Single ply, Z twist white & brown wool	5 - 6	5 - 6

- The pattern is drawn in blue pencil. It is the sampler of a skirt, half untied and the dye is aniline.
- 2 The pattern drawn in pencil on the back. The motif is an 8-petal flower. One edge and ends have a rolled hem, machine stitched. The other edge is selvedge.
- 3, 4, 5 The weave is a twill weave. The stripes are narrow, about ½ cm to 1 cm wide. Number 3 is not dyed yet, the resist stitches are still in place. The pattern is whip stitched with unspun ixtle fiber along white stripes only in irregular horizontal rows. If dyed in red, the white stripe become red with white dots and the brown stripe takes on a reddish hue, as in 4. If dyed in blue, the white stripes become medium blue with a white dots and the brown stripes become dark blue, 3. Number 5 was purchased in the 1980's at MNAIP by Pamela Scheinman. It is dyed in blue. Both 4 and 5 were woven in a long web, 132 cm and 140 cm respectively and then doubled. The sides are open. The fringe is two 2 ply cords twisted together.

Notes

- 1. For a discussion of the possible identity of the fiber meant by the term *pita*, see Mauersberger 1951, p. 463.
- 2. Virginia Fields (in Reents-Budet 1994, p. 315) describes the garments as batik-patterned. Batik is a resist technique using a wax substance applied to an area to keep dye from penetrating. Although beeswax existed as a material in Mesoamerica, there is no convincing evidence as to its use as a resist material. The shapes of the motifs here and elsewhere seem to point to tie resist.
- 3. Irmgard W. Johnson called this source to my attention.
- 4. For overviews, see Cline 1975 and Sten 1983.
- 5. Tribute depicted in the *Codex Mendoza* shows both tie-resist and bound-yarn resist tribute from these areas (Anawalt 2001, pp. 190–91).
- 6. The Coronel Collection is divided between the Seaver Center, Los Angeles County Museum of Natural History, and the Los Angeles County Museum of Art.
- 7. Señor del Valle came to the Los Angeles area in 1891. Original accession records (1904–05), Coronel Archive, Seaver Center, Los Angeles County Museum of Natural History.
- Of the sixteen skirt examples (including the one from the Coronel Collection) studied that have both field and border patterns, there is one with red, yellow, blue, and white motifs on a brown background; there are three with white motifs on a red background and six with red and white motifs on a blue background. Six have white motifs on a blue background. Two additional skirts have only border patterns with white motifs on a blue background. The four color combinations (white on blue; white on red; red and white on blue; yellow, red, blue, and white on brown), the specific layout, stitch and tie techniques, and dyes are discussed below in the context of Elsie McDougall's field research of 1935-36 and Irmgard W. Johnson's field research in 1953 in Querétaro.
- 9. Other examples can be seen in the Talavera collection of the Hispanic Society of America. Examples are pictured in Barber 1908, p. 52; Barber 1911, p. 57; Cervantes 1939, p. 243; Kuyama 1997, pp. 76–77.

10. China poblana costume is a mestiza style of dress that has been evolving since the seventeenth century into the female costume symbolic of Mexican nationalism. It is said to have originated with the dress of a Chinese woman who arrived in Puebla in 1625 via the Manila galleon (Davis ms., p. 1).

Elizabeth Cuéllar (letter to author, 23 June 2001) writes about these two skirts: "he (Luis Márquez) probably bought them... and had them made up as parts of china poblana costumes—sequins and all." Apparently, Márquez had a reputation for taking liberties in the presentation of Mexican Indian costume. See also DeWar 1963, p. 16.

11. In a letter dated 16 December 1949 to Frederick Pleasants, assistant curator at the Brooklyn Museum, McDougall writes:

"I once owned a plangi patterned 'skirt' cloth similar to the one in the Brooklyn Museum collection, but with floral border design somewhat more elaborate. The provenance of mine was given as Zacatecas... I separated the six separately woven and patterned breadths of my specimen... giving one to Peabody Museum, another to Stockholm, and to Charles Ikle of New York." In another letter to Dr. Alvin Tozzer, Peabody Museum, 1 November 1937, McDougall says she gave the final two panels to the Smithsonian (McDougall ms.b); also Accession notes, AMNH 65/5158. See Table I, #4.

- 12. It is hoped that research in collections in Mexico and the United States have made this database exhaustive. The author would very much appreciate being contacted by anyone having knowledge of additional examples.
- 13. It should be pointed out that all the researchers (McDougall, Johnson, and Lechuga) use the term "aniline" for any synthetic dye. There was no attempt to find out which or what type of synthetic dye was used.
- 14. It was very likely collected by Bodil Christensen and Irmgard W. Johnson (Irmgard W. Johnson, letter to author, 15 March 2000).
- 15. I worked with Irmgard W. Johnson in Mexico City in September and October 1995. Her extensive knowledge of textiles and experience of collecting in the field enabled her to give precise data on examples that we examined in museums.

- 16. Lechuga made the same observation about Señora Aguilar (Lechuga 1979, p. 12). Lechuga (1991, pp. 206–207) also discusses the reserve techniques of the Otomí.
- 17. Lechuga gives further precise procedures for stitch-and tie-resist fabrics, dyes, and the *jorongo* (Lechuga 1979, pp. 9–11).
- 18. Crichton recounts that one woman in the general store said that the skirt was worn at fiestas with a blouse embroidered with an eagle and flowers (letter, 8 June 1970, pp. 2, 5, receipt file #s-3940–3942).
- 19. See Table III, #4, #5 and #6 for examples collected by Christensen.
- 20. My data comes from this excellent account of the research done by Dr. Lechuga and Marta Turok. In addition, I recorded an interview with Marta Turok on 23 December 1996.
- 21. This technique is a bound-yarn resist simulation. Two features distinguish it from the bound-yarn resist method: (1) The weft stays the original color (in this case, brown) in the areas that are bound after weaving. All other areas, warp and weft, are tinted by dyeing after weaving. (2) The plied braid has spots of the original white of the white stripe. If the white warp were bound and dyed before weaving, this would not be the case, for no original color would remain.

The only other instance I know of in which a bound-yarn resist appearance is created by binding after weaving is in *pewo* of the Rongkong Toraja, Central Celebes, which have woven slits (Holmgren and Spertus 1989, p. 56).

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